WHAT IS CLAIMED IS:

1. A laser processing method for irradiating a mask with a plurality of openings formed therein with a pulse laser, and irradiating a plurality of portions of a work to be processed with said pulse laser transmitted through said plurality of openings at the same time, said method comprising:

moving said mask and said work with respect to each other and emitting said pulse laser a plurality of times; and

setting a relation between a relative movement speed of said mask and said work and an emission timing of said pulse laser such that respective laser irradiated regions disposed adjacent to one another on said work are formed by irradiation with said pulse laser transmitted through said openings formed in positions different from one another on said mask, and boundaries of said laser irradiated regions disposed adjacent to each other contact at least each other.

2. The laser processing method according to claim 1, further comprising: emitting said pulse laser at a constant timing a plurality of times; and moving said work at a constant speed.

3. The laser processing method according to claim 1, further comprising: moving said mask and said work with respect to each other so that said boundaries of said laser irradiated regions disposed adjacent to

each other overlap each other.

4. The laser processing method according to claim 1, further comprising:

allowing said mask to have a width of said opening and a pitch between said openings formed in a width length and a pitch interval determined by physical properties of said work, when said work is irradiated with said pulse laser;

moving said mask and said work with respect to each other and emitting said pulse laser a plurality of times; and

poly-crystallizing said work of the laser irradiated region irradiated with said pulse laser in said work.

5. The laser processing method according to claim 1, wherein said work is a silicon film formed on a substrate,

said mask has a width of said opening and a pitch between said openings formed in a width length and a pitch interval such that a heat gradient is generated in said laser irradiated region on said silicon film, and

said silicon film is irradiated with said pulse laser, and said silicon film of said laser irradiated region is poly-crystallized to form a polycrystalline silicon film having a predetermined or larger particle diameter.

6. The laser processing method according to claim 1, wherein said mask has the plurality of openings formed in the same shape, and an interval between said plurality of openings is formed at an equal pitch.

7. The laser processing method according to claim 1, wherein said mask has said opening formed in any one shape of a linear shape, a polygonal shape, a ring shape, a dotted shape, a plurality of polygonal shapes having different sizes, and a linear shape inclined with respect to a movement direction of said mask.

8. The laser processing method according to claim 1, wherein said mask is divided into a plurality of regions, and a shape of said opening is formed in a portion in which the divided regions superposed upon one another do not overlap one another.

9. The laser processing method according to claim 1, wherein said work is a silicon film formed on a substrate, and

said mask has said plurality of openings formed in a direction corresponding to a growth direction of a crystal, when said silicon film is irradiated with said pulse laser and poly-crystallized.

10. A laser processing method for irradiating a mask with a plurality of linear openings formed therein with a pulse laser, and irradiating a plurality of

portions of a silicon film with said pulse laser transmitted through said plurality of openings at the same time, said method comprising:

allowing said mask to have said plurality of openings formed in the same direction, and have a width of said opening and a pitch between said openings formed in a width length and a pitch interval such that a heat gradient is generated in a laser irradiated region at a time of irradiation of said silicon film with said pulse laser;

moving said silicon film in one direction at a constant speed and emitting said pulse laser at a constant timing a plurality of times;

setting the emission timing of said pulse laser such that said laser irradiated regions disposed adjacent to one another on said silicon film are formed by irradiation with said pulse laser transmitted through said openings formed in positions different from one another on said mask, and boundaries of said laser irradiated regions disposed adjacent to each other contact at least each other; and

poly-crystallizing said silicon film of said laser irradiated region to form a polycrystalline silicon film having a predetermined or larger particle diameter, and continuously forming a plurality of said poly-crystallized laser irradiated regions.

11. A laser processing apparatus for irradiating

a mask with a plurality of openings formed therein with a pulse laser, and irradiating a plurality of portions of a work to be processed with said pulse laser transmitted through said plurality of openings at the same time, said apparatus comprising:

a laser device which outputs said pulse laser;

a moving section which moves said mask and said work with respect to each another; and

a controller which controls said moving section to move said mask and said work with respect to each other, and controls said laser device to emit said pulse laser a plurality of times,

wherein said controller controls said moving section to move said mask and said work with respect to each other so that respective laser irradiated regions disposed adjacent to one another are irradiated with said pulse laser transmitted through said openings different from one another among said plurality of openings, and boundaries of said laser irradiated regions disposed adjacent to each other contact at least each other.

12. The laser processing apparatus according to claim 11, wherein said controller controls said laser device to emit said pulse laser at a constant timing a plurality of times, and controls said moving section to move said work at a constant speed.

13. The laser processing apparatus according to

claim 11, wherein said controller controls said moving section and said laser device to move said mask and said work with respect to each other so that said boundaries of said laser irradiated regions disposed adjacent to each other overlap each other.

14. The laser processing apparatus according to claim 11, wherein said mask has a width of said opening and a pitch between said openings in a width length and a pitch interval determined by physical properties of said work, when said work is irradiated with said pulse laser,

said mask and said work are moved with respect to each other and said pulse laser is emitted a plurality of times, and

said work of the laser irradiated region irradiated with said pulse laser in said work is poly-crystallized.

15. The laser processing apparatus according to claim 11, wherein said work is a silicon film formed on a substrate,

a width of said opening and a pitch between said openings are formed in a width length and a pitch interval such that a heat gradient is generated in said laser irradiated region on said silicon film, and

said controller controls said moving section and said laser device to irradiate said silicon film with said pulse laser, and said silicon film is

poly-crystallized to form a polycrystalline silicon film having a predetermined or larger particle diameter.

16. The laser processing apparatus according to claim 11, wherein said opening is formed in any one shape of a linear shape, a polygonal shape, a ring shape, a dotted shape, a plurality of polygonal shapes having different sizes, and a linear shape inclined with respect to a movement direction of said mask.

17. The laser processing apparatus according to claim 11, wherein said mask is divided into a plurality of regions, and said plurality of openings are formed in portions in which the divided regions superposed upon each other do not overlap each other.

18. The laser processing apparatus according to claim 11, wherein a width length of said opening is 5 μm or less, and a pitch between said plurality of openings is formed in 1 μm or more.

19. The laser processing apparatus according to claim 11, further comprising a lighting optical system which shapes and uniforms said pulse laser output from said laser device and irradiates said work through said mask.

20. A laser processing apparatus for irradiating a silicon film with a pulse laser, comprising:

a laser device which outputs said pulse laser;

a mask having a plurality of linear openings

formed in the same direction, and having a width of the opening and a pitch between said openings formed in a width length and a pitch interval such that a heat gradient is generated in a laser irradiated region at a time of irradiation of said silicon film with said pulse laser;

a moving section which moves said mask and said silicon film with respect to each other; and

a controller which controls said moving section to move said mask and said silicon film with respect to each other, and controls said laser device to emit said pulse laser a plurality of times,

wherein said controller allows said respective laser irradiated regions disposed adjacent to one another on said silicon film to be formed by irradiation with said pulse laser transmitted through said openings formed in positions different from one another on said mask, and allows said laser device to output said pulse laser at a timing at which boundaries of said laser irradiated regions disposed adjacent to each other contact at least each other, and

said silicon film of said laser irradiated region is poly-crystallized to form a polycrystalline silicon film having a predetermined or larger particle diameter, and a plurality of said poly-crystallized laser irradiated regions are continuously formed.